



ManTech International Corporation

Managing Technology
for a Changing World

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**Environmental
science and
technology**

**Predictive
Modeling and risk
Assessment**

**Natural
Resource
Management**

~~Integrating Ecosystem Management with~~ Range Readiness Goals on US Air Force Ranges

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Ecosystem Management



Ecosystem Management goals:

- Sustainment Paradigm

 - “Need to clean house forever”;

 - “Natural resources are a commodity with value”;

 - “We need to sustain, restore, and modernize the resource base”

(Ms. Maureen T. Koetz, Deputy Assistant Secretary Air Force)

- maintaining and enhancing ecosystem health (i.e., ecological processes, water and air quality standards, habitat protection)

- integrating ecosystem integrity, social capacity, and economic viability values with range readiness goals

- maintain altered ecological areas, rehabilitate high military use areas, protect T&E species, preserve unique ecological areas, build partnerships

First Fire- DCBR-May 2003

Major Fire History DCBR

2003 - May - 2,600 Acres

1997 - April - 325 Acres

1995 - May - 300 Acres

1985 - June - 400 Acres

1980 - March - 28,000 Acres

1971 - March - 29,300
Acres

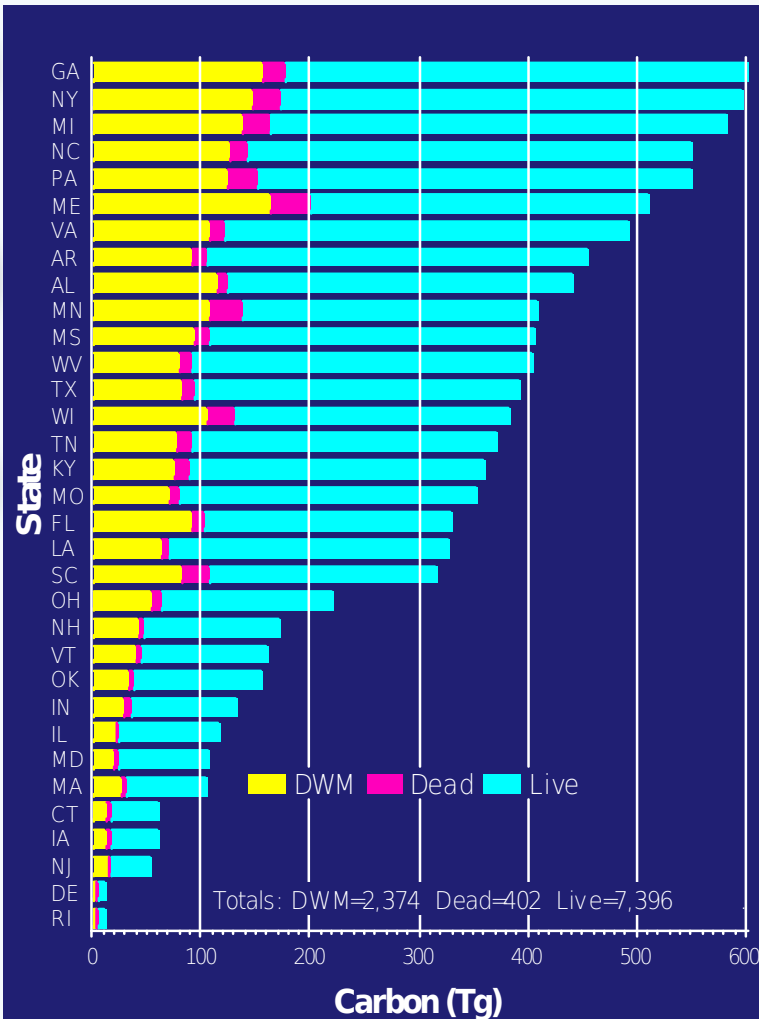
On average, 100 wildland
fires are started each year
on the DCBR. Mandatory



DCBR Prescribed Burn - Feb. 2000



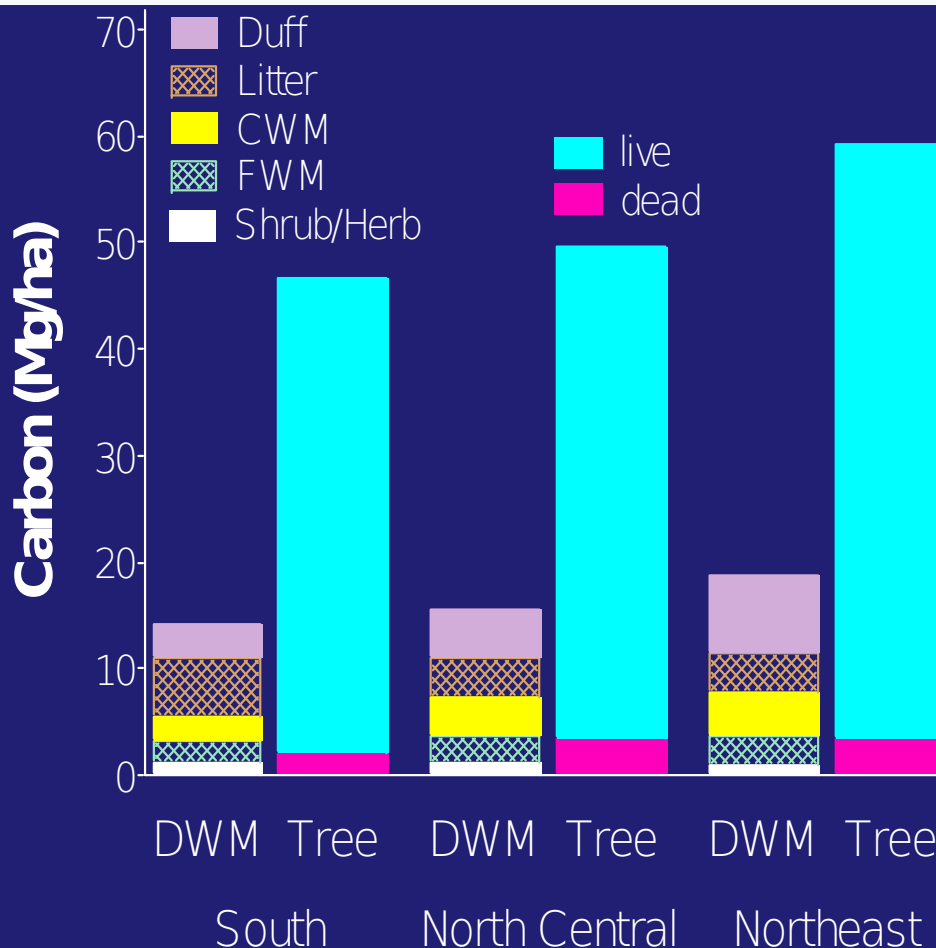
Wildland Fire Fuels



Aboveground carbon in forest of eastern U.S. states varies from 10 to 600 Tg ((1 Tg = 1,000,000 tons). Most is stored in live trees, a small portion is in standing dead trees, and the rest is in DWM. Estimates are based on 99,312 plots in the USDA Forest Service Forest Inventory and Analysis (FIA) database.

(1 Tg = 1,000,000 tons)

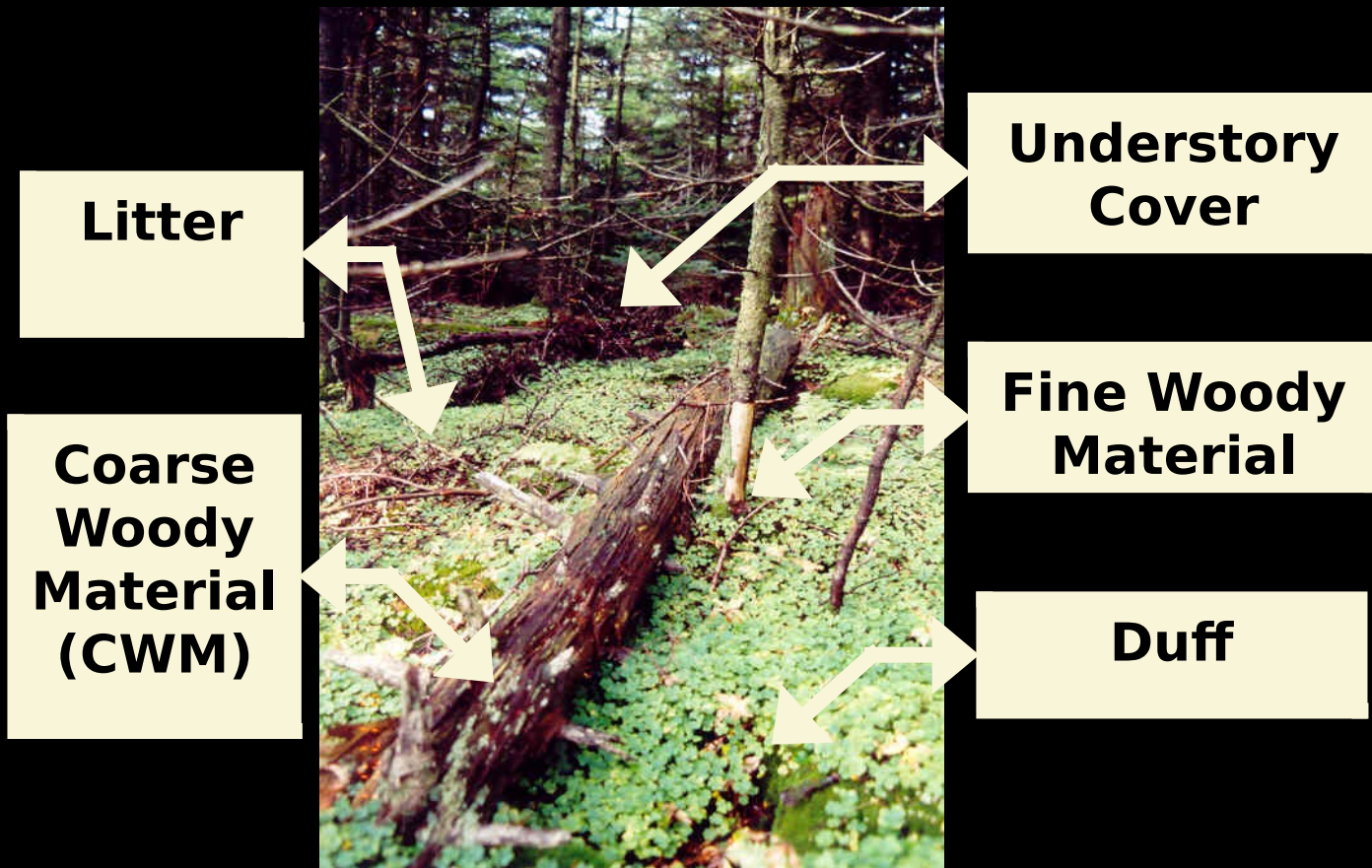
Wildland Fire Fuels



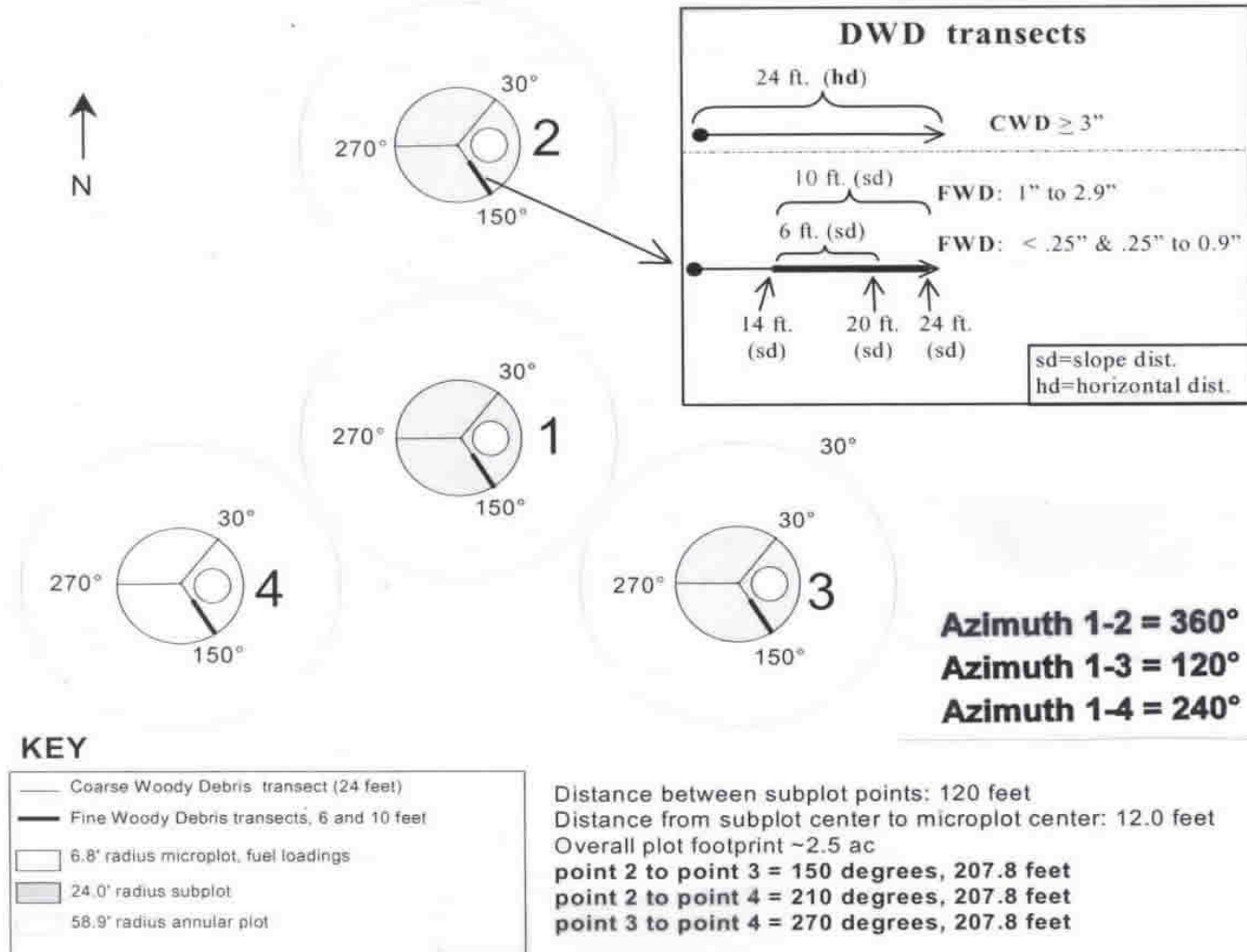
On average, the estimated carbon in DWM is about 1/4 of that in standing trees for 99,312 plots in the FIA database, 2000.

Carbon increases

Forest Inventory and Monitoring



Forest Inventory and Monitoring Plots



Establishment of Field Plots



Vegetation Transects



Measurement of Live and Dead Fuels



DCBR Understory Vegetation



DCBR Overstory Vegetation



Plot 16 ARNWR
Closed Pond Pine



Plot 1 DCBR
Evergreen Hdwd.
Mix



Plot 19 ARNWR
Open Pond Pine



Forest Fuel Model Comparison



- **Fuel Model 4- 14 plots**
Chaparral (6 feet)

	Albini model	DDW model
--	-------------------------	----------------------

-
- | | | |
|--------------|------|-------|
| • 1 hr | 5.01 | 0.5 |
| • Litter | | 4.0 |
| • 1 hr total | | 4.5 |
| • 10 hr | 4.01 | 3.2 |
| • 100hr | 2.00 | 2.6 |
| • Duff | | 137.9 |

- **Fuel Model 7- 16 plots**
Southern rough

	Albini model	DDW model
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-
- | | | |
|--------------|------|-------|
| • 1 hr | 1.13 | 0.4 |
| • Litter | | 4.9 |
| • 1 hr total | | 5.3 |
| • 10 | 1.87 | 2.5 |
| • 100hr | 1.50 | 2.6 |
| • Duff | | 137.9 |

Fuels measured in tons per acre

Ecosystem Management on Military Training Facilities



Capabilities

- ❖ Ecological and biological assessments
- ❖ Field data sampling design and collection
- ❖ Development of land manager decision support tools
- ❖ Geospatial and remote sensing software and hardware
- ❖ Water and air monitoring

Applications

- ❖ Water quality
- ❖ Soil erosion control
- ❖ Threatened and endangered species
- ❖ Reduction in wildfire risk
- ❖ Geobase development
- ❖ Commercial forestry
- ❖ Military training impacts
- ❖ Encroachment
- ❖ UXO

Media

- ❖ Surface and ground water
- ❖ Soil
- ❖ Air
- ❖ Plant and animal communities

Specialty Areas - Ecosystem Management on Military Training Facilities

Ecosystem Management

Land managers on military training facilities need tools to enable them to predict the impacts of ecosystem management activities, such as prescribed burning to reduce wildland fire risk and habitat management for terrestrial threatened and endangered species in the surrounding wetlands, estuaries, and near-coastal



**Terrestrial
Ecosystem Management**



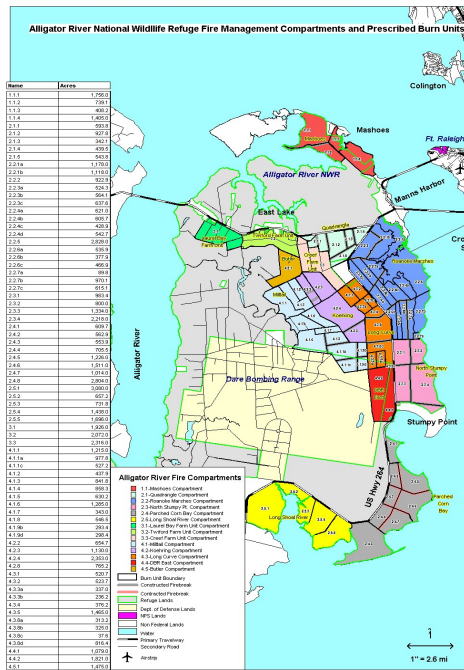
**Aquatic
Ecosystem
Management**



Specialty Areas - Wildland Fire Habitat Management and Risk Reduction



Wildland fires in the firing range impact areas and the surrounding forests and rangelands pose significant risks to range management, the forest and aquatic ecosystems, and adjacent communities. A history of fire suppression policies throughout the region have resulted in some of the highest wildland fire fuels loads in the eastern U.S.



Specialty Areas - GeoBase "One Base - One Network - One Map"

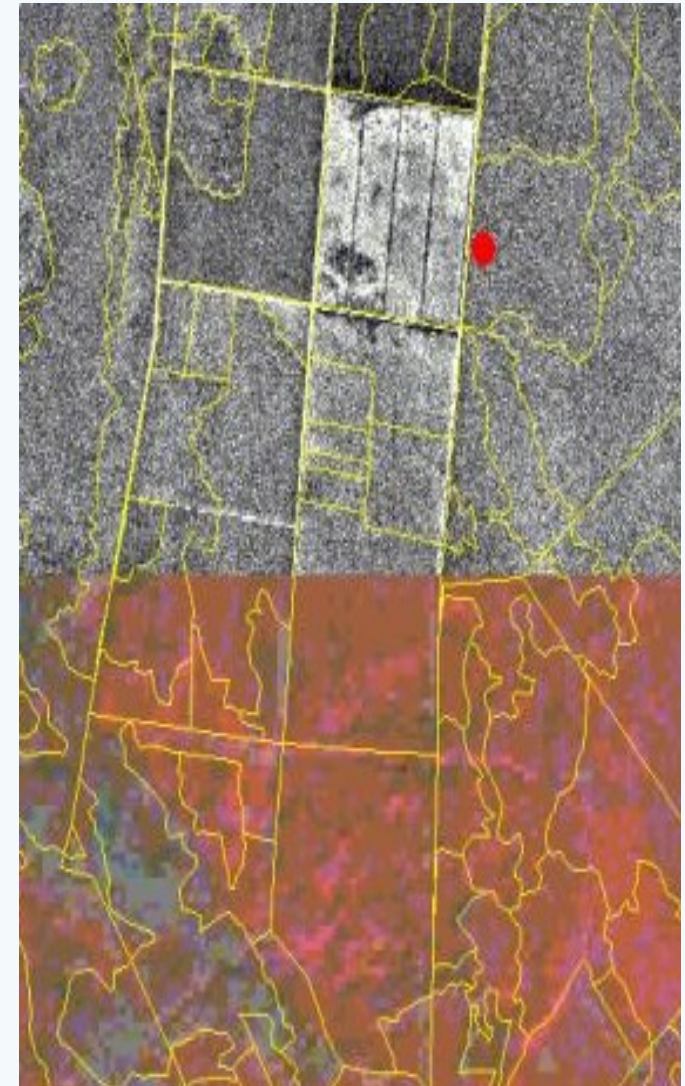


GeoBase - Remotely Sensed and Ground Data

Development of a remotely sensed data processing technique to utilize remotely sensed satellite sensor data, digital large scale photographs, and ground plot data to develop vegetation, fuel load, habitat, and surface hydrology maps which can then be applied to the management of military training facilities



Incorporating existing GIS vegetation data, or classify newly acquired aerial photography using onscreen stereoscopic delineation techniques to create a digital vegetation and surface hydrology database



Specialty Areas - Water Quality and Soil Erosion



Land management activities (prescribed fire, commercial forestry, T&E species habitat)

Measure water quality responses of military training and land



Assess soil erosion impacts of military training and land management activities

Specialty Areas - Threatened and Endangered Species



Quantify the disturbance effects of military training and land management activities in forests, wetlands, surface and near-coastal waters habitats



Development of integrated assessment tools for TES mapping, habitat, hydrology modeling, and adaptive land management in a GIS based system



Photo Steve Morello



Future Ecosystem Management Projects at DCBR



Air Force Priority Projects



1. Integrate ecosystem management with range readiness goals;
2. Reducing wildland fire risk through vegetation management;
3. Sustainability of Air Force and Navy impact areas;
4. Habitat management for T&E species;
5. Forest management of 1,200 acres of Atlantic white cedar;
6. An overall inventory of the roughly 13,600 acres of commercial forestland available for active management;
7. A continuous forest inventory (CFI) system of periodically measured permanent plots to monitor changes in stand structure and growth rates;
8. Develop partnerships with federal and state agencies,